Journal of Limnology and Freshwater Fisheries Research
limnofish
http://www.limnofish.org

Detection of Zooplankton Fauna in Downstream of Euphrates

Ahmet BOZKURT*, M. Ayçe GENÇ

İskenderun Technical University, Marine Sciences and Technology Faculty, 31200, İskenderun, Hatay, Turkey

ABSTRACT

Zooplankton samples were taken for determination of the zooplankton fauna of the lower Euphrates basin (between Birecik Dam Lake and Karkamış Dam Lake). In the study, 10 families from Rotifera, 6 families from Cladocera and 4 families from Copepoda, totally 20 family were found. A total of 41 zooplankton species were identified. From Rotifera, Lepadellidae was the most species rich family with 4 species, from Cladocera, Daphnidae was the most species rich family with 4 species and from Copepoda, Cyclopoidae was the most species rich family with 7 species.

Keywords: Down the Euphrates, Birecik Dam Lake, Karkamış Dam Lake, zooplankton

ARTICLE INFO

RESEARCH ARTICLE

Received : 14.11.2017
Revised : 06.02.2018
Accepted : 08.02.2018
Published : 27.04.2018

DOI:10.17216/LimnoFish.352108

**** CORRESPONDING AUTHOR***

ahmet.bozkurt@iste.edu.tr
Tel : +90 326 614 16 93 (3405)

Aşağı Fırat Nehri'nin Zooplankton Faunasının Tespiti

Öz: Aşağı Fırat havzasının (Birecik Baraj Gölü ile Karkamış Baraj Gölü arasındaki) zooplankton faunasının tespiti için Zooplankton örnekleri toplanmıştır. Çalışmada, Rotifera'dan 10, Cladocera'dan 6 ve Copepoda'dan 4 familya olmak üzere toplam 20 familya bulunmuştur. Toplam 41 zooplankton türü tespit edilmiştir. Rotifera'dan Lepadellidae 4 türle, Cladocera'dan Daphnidae 4 tür ile Copepoda'dan Cyclopoidae 7 tür ile en zengin familyaları oluşturmuşlardır.

Anahtar kelimeler: Aşağı Fırat Nehri, Birecik Baraj Gölü, Karkamış Baraj Gölü, zooplankton

Alıntılama
Bozkurt A, Genç MA, 2018. Detection of Zooplankton Fauna in Downstream of Euphrates. LimnoFish. 4(1): 13-16. doi: 10.17216/LimnoFish.352108

Introduction

Wetlands that are regarded as natural resources of the world because of their biodiversity; are the most important ecosystems of the earth with their natural functions and economic values. They regulate the water regime of the region by feeding or discharging underground waters, storing flood waters, controlling floods, and preventing the entry of sea water on coasts. They have a positive effect on the local climatic factors, mainly rainfall and temperature, by raising the humidity in the region.

The primary function of freshwater zooplankton is an important component in aquatic ecosystems, which act as primary and secondary links in the food chain. Zooplankton community structure is affected by physical and chemical environment. These communities are also affected by biological interactions, predation and their competition for food resources (Neves et al. 2003). Most groups of zooplankton have been used as a bioindicator for monitoring aquatic ecosystems and the integrity of water. Zooplankton community may be considered as a bioindicators of eutrophication, because they are coupled to environmental conditions, responding more rapidly to changes than do fishes, and are easier to identify than phytoplankton. Therefore, they are potential value as water quality indicators (Sládecek 1983; Murugan et al. 1998).

This study was carried out to determine the zooplankton fauna of the lower Euphrates basin, where no studies have been conducted on zooplankton until now.

Materials and Methods

The samples of zooplankton were collected from 3 stations in lower Euphrates basin

(First station 37° 01'11" N, 37° 58' 16" E; second station 36° 57' 44" N, 38° 00' 23" E; third station 36° 53' 52" N, 38° 01' 48" E) (Figure 1) by using a plankton net with 60 µm mesh size. The net was hauled horizontally during 20 minutes in July and September 2015, during routine survey cruises and then samples were replaced into glass jar. The samples were fixed with 4% buffered formaldehyde. The zooplankton species examination was done using an Olympus CH40 microscope. To identify the species, the works of Ruttner-Kolisko (1974), Koste (1978), Segers (1995), Scourfield and Harding (1966), Smirnov (1974), Negrea (1983), Korinek (1987), Pennak (1989), Borutsky (1964), Dussart (1969), Damian-Georgescu (1970), and Kiefer and Fryer (1978) were reviewed.

Figure 1. Study area and sampling stations

Results

In the study a total of 41 species were found, including 19, 12 and 10 taxa belonging to Rotifera, Cladocera and Copepoda, respectively.

Table 1. Zooplankton species in the study area

Species	Stations		
ROTIFERA			
Lepadellidae	1	2	3
Colurella colurus (Ehrenberg, 1830)	-	+	+
Lepadella ovalis (Müller, 1786)	+	+	+
Lepadella patella (Müller, 1773)	+	+	+
Lepadella quadricarinata (Stenroos, 1898)	+	-	+
Lecanidae			
Lecane closterocerca (Schmarda, 1859)	+	+	+
Lecane luna (Müller, 1776)	+	+	+
Lecane quadridentata (Ehrenberg, 1830)	-	-	+
Brachionidae			
Euchlanis dilatata Ehrenberg, 1832	-	+	+
Keratella cochlearis (Gosse, 1851)	+	+	+
Keratella tropica (Apstein, 1907)	+	+	+
Synchaetidae			
Polyarthra dolichoptera Idelson,1925	+	+	+
Synchaeta stylata Wierzejski, 1893	-	-	+
Trichocercidae			
Trichocerca capucina (Wierzejski & Zacharias, 1893)	-	+	+
Trichocerca elongata (Gosse, 1886)	-	-	+
Dichranophoridae			
Dicranophorus epicharis Harring & Myers, 1928	-	-	+
Asplanchnidae			
Asplanchna priodonta Gosse, 1850	-	+	+
Mytilinidae			
Lophocharis salpina (Ehrenberg, 1834)	-	+	+
Testudinellidae			
Testudinella patina (Hermann, 1783)	+	+	+
Notommatidae			
Cephalodella gibba (Ehrenberg, 1830)	+	+	+
CLADOCERA			
Daphnidae			
Ceriodaphnia pulchella Sars, 1862	+	+	+
Daphnia cucullata Sars, 1862	-	-	+
Daphnia longispina (Mueller, 1785)	+	-	+
Simocephalus expinosus (Koch, 1841)	-	+	+
Chydoridae			
Alona guttata Sars, 1862	+	+	+
Chydorus sphaericus (Müller, 1776)	+	+	+
Grabtoleberis testudinaria (Fischer, 1851)	-	+	+
Eurycercidae			
Camptocercus uncinatus Smirnov 1971	-	+	+
Pleuroxus laevis Sars, 1861	+	-	+
Porcellionidae			
Eurycercus lamellatus (Müller, 1776)	-	+	+
Bosminidae			
Bosmina longirostris (Müller, 1785)	+	+	+
Sididae			
Diaphanosoma birgei Korinek, 1981	-	-	+
COPEPODA			
Cyclopoidae			
Acanthocyclops robustus (Sars, 1863)	-	-	+
Cyclops vicinus Ulyanin, 1875	+	+	+
Diacyclops bicuspidatus (Claus, 1857)	-	+	+
Eucyclops serrulatus (Fischer, 1851)	-	+	+
Macrocyclops albidus (Jurine, 1820)	-	-	+
Megacyclops viridis (Jurine, 1820)	-	+	+
Thermocyclops dybowskii (Landé, 1890)	-	+	+
Diaptomidae			
Acanthodiaptomus denticornis (Wierzejski, 1887)	-	-	+
Ameiridae			
Nitocra hibernica (Brady, 1880)	+	+	+
Canthocamptidae			
Bryocamptus zschokkei (Schmeil, 1893)	-	-	+

Detected ten families from Rotifera, Lepadellidae was the most species rich family with 4 species followed by Lecanidae and Brachionidae with 3 species each one. While Synchaetidae and Trichocercidae were represented by two species, Dichranophoridae, Asplanchnidae, Mytilinidae, Testudinellidae and Notommatidae were represented one species.

Six families were detected from Cladocera, Daphnidae was the most species rich family with 4 species followed by Chydoridae with 3 species. Porcellionidae, Bosminidae and Sididae had the least species followed by Eurycercidae with 2 species. In the Copepoda with four families, Cyclopoidae had 7 species and others, Diaptomidae, Ameiridae and Canthocamptidae had 1 species each one. It was determined that some species with wide spread from Rotifera, *Cephalodella gibba* (Ehrenberg, 1838), *Keratella cochlearis* (Gosse, 1851), *K. tropica* (Apstein, 1907), *Lecane closterocerca* (Schmarda, 1859), *L. luna* (Müller, 1776), *Lepadella ovalis* (Müller, 1786), *L. patella* (Müller, 1786), *Testudinella patina* (Hermann, 1783), from Cladocera *Bosmina longirostris* (Müller, 1785), *Ceriodaphnia pulchella* Sars, 1862, *Alona guttata* Sars, 1862, *Chydorus sphaericus* (Müller, 1776), from Copepoda *Cyclops vicinus* Uljanin, 1875, *Nitocra hibernica* (Brady, 1880) were present at all sampling stations. At the same time some species were found only one station and a few amount. These species from Rotifera *Dichranophorus epicharis, Lecane quadridentata, Synchaeta stylata, Trichocerca elongata,* from Cladocera *Daphnia cucullata, Diaphanosoma birgei,* from Copepoda *Acanthocyclops robustus, Macrocyclops albidus, Acanthodiaptomus denticornis* and *Bryocamptus zschokkei* were found in only one station.

Discussion

No studies have been found on zooplankton in the Downstream of Euphrates. But some zooplankton studies found belong to the upper parts of the Euphrates River. These studies; Saler et al. (2015) reported that they found 32 species from Rotifera, 5 species from Cladocera and 2 species from Copepoda. Rabee (2010) reported that 32 taxa belonged to Rotifera, 12 to the Cladocera and 7 to the Copepoda in Euphrates River in the North part of Iraq. Saler et al. (2014) declared that they found 15 species from Rotifera, 6 species from Cladocera and 2 species from Copepoda were identified in Uzunçayır Dam Lake in the North part of the Euphrates River. Bulut and Saler (2014) declared that they found in 25 species from Rotifera, 6 species from Cladocera and 2 species from Copepoda in Murat River (between Elazığ and Palu). It is seen that there are significant differences in species diversity between our study and other studies. The reason of this, Euphrates system is a very large river system. In order to it passes through two geographical regions, it is under the influence of different climate zone. Thus its zooplankton content varies considerably in terms of quality and quantity.

Rotifera is the dominant group among all zooplankton groups qualitatively and quantitatively in freshwater ecosystem (Saksena 1987). The result obtained in the study was accordance with results of Saksena (1987).

It was reported that almost all species found in the study wide spread, common, cosmopolitan (Eldredge and Evenhuis 2003; Hutchinson 1967; Ruttner-Kolisko 1974; Braioni and Gelmini 1983; Ramdani et al. 2001) and they were reported from lots of study inland waters of Turkey (Ustaoğlu et al. 2004).

The presence of identified species in the study seems to be compatible with their ecological characters.

References

Borutsky EV. 1964. Freshwater Harpacticoida. Fauna of U.S.S.R. (Crustacea), Vol. 3. Jerusalem: Israel Program for Scientific Translations 607 p.

Braioni MG, Gelmini D. 1983. Guide per il reconoscimento delle specie animali delle acque interne Italiane: Rotiferi monogononti. Italy: Consiglio Nazionalie delle Ricerche, 181p.

Bulut H, Saler S. 2014. Murat Nehri'nin (Elazığ-Palu ilçe merkezi sınırları içindeki bölümün'de) zooplanktonu ve değişimi. Türk Tar Gıda Bil ve Tek Derg. (TURJAF). 2(1): 13-17. doi: 10.24925/turjaf.v2i1.13-17.32

Damian-Georgescu A. 1970. Fauna republicii socialiste Romania, crustacea. Vol. IV. 11 Copepoda, harpacticoida. Bucharest: Academiei Republicii socialiste Romania 249 p.

Dussart BH. 1969. Les copépodes des eaux continentales d'europe occidentale, 2: Cyclopoides et biologie. Paris: N. Boubée et Cie. 500 p.

Eldredge LG, Evenhuis NL. 2003. Hawaii's biodiversity: a detailed assessment of the numbers of species in the Hawaiian Islands. Bishop Mus Occas Pap. 76:1-28

Hutchinson GE. 1967. A treatise on limnology. Vol. 2: Introduction to lake biology and the limnoplankton. New York: Wiley 1115 p.

Kiefer F, Fryer G. 1978. Das Zooplankton der Binnengewässer. Teil 2. Stuttgart: E. Schweizerbartsche Verlag, 380 p.

Korinek V. 1987. Revision of three species of the genus Diaphanosoma Fischer, 1850. Hydrobiologia 145 (1): 35-45.

Koste W. 1978. Rotatoria. Die radertiere mittel-europas, 2nd ed. Berlin and Stuttgart: Gebruder borntraeger 673p.

Murugan N, Murugavel P, Kodarkar MS. 1998. Cladocera: The biology, classification, identification and ecology. Indian Association of Aquatic Biologists (IAAB), Hyderabad.

Negrea ST. 1983. Fauna republblici socialiste Romania. vol. 4, 12. Crustacea Cladocera. Bucharest: Academia Republblici Socialiste Romania 399 p.

Neves IF, Rocha D, Roche KF, Pinto AA. 2003. Zooplankton community structure of two marginal lake of river (Cuiaba) (Mato, Grosso, Brazil) with analysis of rotifer and Cladocera diversity. Braz J Biol. 63 (2): 329–343. doi:10.1590/S1519-69842003000200018

Pennak RW. 1989. Coelentera. In: fresh-water invertebrates of the United States: Protozoa to mollusca, 3rd edition. New York: John Wiley & Sons p. 110–127.

Rabee AM. 2010. The effect of al-tharthar-euphrates canal on the quantitative and qualitative composition of zooplankton in euphrates River. Journal of Al-Nahrain University. 13 (3): 120-128

Ramdani M, Flower RJ, Elkhiati N. 2001. Zooplankton (Cladocera, Ostracoda), chironomidae and benthic fauna remains in sediment cores from nine North African wetland lakes: The CASSARINA Project. Aquat Ecol. 35 (3-4): 389–403. doi:10.1023/A:1011965226399

Ruttner-Kolisko A. 1974. Plankton rotifers. biology and taxonomy. Die Binnengewiisser V. 26, Part 1. Stuttgart: Schweizerbart. 146 p.

Saksena ND. 1987. Rotifers as indicator of water quality. Acta Hydrochimica et Hydrobiologica. 15(5): 481-485. doi: 10.1002/aheh.19870150507

Saler S, Bulut H, Birici N, Tepe R, Alpaslan K. 2015. Karasu Nehri (Erzincan)'nin zooplanktonu. Eğirdir Su Ürün Fak Derg. 11(1):10-16. doi: 10.22392/egirdir.246346

Saler S, Haykır H, Baysal N. 2014. Zooplankton of Uzunçayır Dam Lake. J FisheriesSciences.com. 8(1):1-7. doi: 10.3153/jfscom.2014001

Scourfield DJ, Harding JP. 1966. A key to the british freshwater cladocera. England: Fresh Biol. Ass.Sci. Publ. No. 5. 61 p.

Segers H. 1995. "World records of Lecanidae (Rotifera: Monogononta)." Studiedocumenten Van Het Koninklijk Belgisch Instituut Voor Natuurwetenschappen, 81, 114 p.

Sládecek V. 1983. Rotifers as indicators of water quality. Hydrobiologia. 100 (1): 169-201. doi: 10.1007/BF00027429

Smirnov NN. 1974. Fauna of the U.S.S.R. Crustacea. Vol. 1. No. 2, Chydoridae, Jerusalem: I.P.S.T. 644 pp.

Ustaoğlu MR, Balık S, Özdemir Mis, D. 2004. The rotifer fauna of Lake Sazlıgöl (Menemen, İzmir). Turk J Zool. 28:267-272.